APPENDIX G — AMENDMENT OF THE UNITED STATES PATENT AND TRADEMARK OFFICE DATED OCTOBER 14, 1975

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art No. 233

Applicant: CARL RAYMOND KOLKER

Serial No.: 511,422

Filed: October 2, 1974

For: METHODS AND APPARATUS FOR AUTOMATIC BACKGROUND AND CONTRAST CONTROL

Examiner: Britton

Beverly Hills, California 90212
October 14, 1975

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

AMENDMENT

Sir:

Responsive to the Office Action dated June 20, 1975, please amend the above-identified application as follows:

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IN THE SPECIFICATION:

At page 3, line 27, after "application", please insert -- now U. S. Patent No. 3,843,839 --;

Page 13, line 28, before "to", insert -- now U. S. Patent No. 3,843,839 --;

Page 14, line 16, after "312,114", insert --, now U. S. Patent No. 3,843,839 --;

IN THE CLAIMS:

Claim 1, line 11, after "for", insert -- continually --;

Claim 10, line 3, after "connected", insert -- in shunt connection --;

CANCEL CLAIM 17.

REMARKS

Patent Numbers have been supplied in the specification as required by the Examiner. Correction of the drawings Fig. 1, have been authorized in a separate Letter to the Office Draftsman as required by Examiner and by Item 7 in the Notice of Informal Patent Drawings. In addition, in the correction to the drawings, the input line designated EOF to Unit 41b has been shortened so as to use the same convention with respect to EOF inputs as was used with Unit 43b, i.e., that these are all reception points for the signal EOF from Unit 71.

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In the Office Action, the Examiner rejected all of the claims in this case, Claims 1 through 19, under 35 U.S.C. §103, as obvious over the Krallinger, et al. reference in view of the Johnson reference. This rejection is respectfully traversed for reasons which will be set forth fully below.

In order to clarify the reasons for traversal of the rejection, it is desirable to first briefly describe the nature and structure of the Automatic Background and Contrast Control system of the present invention as contrasted with the Krallinger, et al. and Johnson devices. The ABC unit of the present invention includes both a sequencing circuit and a sampling and signal processing circuit and is specially adapted to be used in a facsimile transmitter or receiver. In such operation with a facsimile transmitter, the transmitter develops a ramp deflection voltage which deflects the transmitter scanning element in a calibration scan across a calibration strip which has first an extended black area and then an extended white area established thereon. The sequencing circuit of the ABC unit is responsive to the transmitter's ramp deflection voltage to produce a first sampling signal when the ramp voltage reaches a predetermined magnitude corresponding to the scanning of the black area of the calibration strip and produces a second sampling signal when the ramp voltage reaches a second predetermined magnitude corresponding to the scanning of the white area of the calibration strip.

In the sampling and signal processing functions the ABC unit is operated under the control of these two separated first and second sampling signals. In response to the first sampling signal, the ABC unit stores in the input capacitor of an operational amplifier a sample of the video signal then being produced by the transmitter scanning element, this sample of the video input

signal thus being representative of the black shade of the calibration strip then being traversed during the calibration scan. In response to the second sampling signal, the ABC unit stores in the input capacitor of a second operational amplifier a second sample of the video input signal corresponding to the white shade or value of the calibration strip being scanned. Thus, at the completion of the calibration scan separate black and white representing samples of the input video signal are held stored in the input capacitors of their respective operational amplifiers, which produce corresponding output voltage signals V_b and V_w representative of the voltage magnitudes of the black and white samples. The black and white samples are held stored throughout the complete scanning of the complete document page and both of them are utilized continuously throughout this period to control the automatic background and contrast control operations of the ABC unit. In such operation the signals V_w and V_b are continuously combined in an operational amplifier to continuously produce a signal representative of the magnitude $V_w - V_b$. In addition, the received video input signal (designated V_{in}) is continuously combined in an operational amplifier with the signal V_b to produce an output signal representative of the magnitude $V_{in} - V_b$. The two output signals $V_{in} - V_b$ and $V_w - V_b$ are continuously combined in a divide circuit to produce a final output signal V_o, which has a magnitude representative of the quantity $\frac{V_{in} - V_b}{V_w - V_b}$. This represents a fully normalized and gain corrected signal which is corrected both for undesired voltage offsets and biases and for undesired gain variations. It is clear that the ABC unit of the present invention is characterized by fully automatic acquisition of separate black and white samples of the video signal by the continual storage of the separate black and white samples throughout the subsequent scanning and transmission of

a document, and by the continuous use during such period of the separately stored black and white samples to continuously correct the video signal received during the scanning of the document. Moreover, the ABC unit of the present invention is further characterized by automatic production and sequencing of the separate black and white sampling signals in response to the corresponding magnitudes of the ramp deflection voltage of the transmitter during the calibration scan.

Referring now in contrast to the Krallinger, et al. device, the Krallinger, et al. patent shows a drum-type facsimile transmitter receiver in which a black line or bar is provided the length of the drum along the left-hand edge of the document to provide a black calibration area at the beginning of each line. The white margin of the document immediately following the black bar provides the white calibration area. A sync signal is generated at the beginning of a line by a mirror and light combination which is aligned with the black bar and flashes a burst of light into a detector. This single sync signal is used as a sampling signal to store the corresponding black signal in the input capacitor of a controllable gain video amplifier to thereby set the reference level of the video amplifier. The immediately following white signal is not sampled or stored but instead, because of its appearance immediately following the black signal, is used in a servo operation to vary the gain of the controllable amplifier so that the amplified white signal is equal to a preset reference voltage V_r. This amplification or gain level once obtained, is held throughout the complete line by the cumulative charge stored in an error capacitor 52 which represents the cumulative level of the error signals produced in the slewing operations of the gain control servo of the amplifier. Capacitor 52 is a storage element but it does not store a sample of the white signal, and, moreover,

a sample of the white signal is not stored at any place or position in the Krallinger, et al. circuit.

In the further operation of the Krallinger, et al. device, during the scanning of the line the input video signal, background corrected by the black signal stored in capacitor 20, is multiplied by the temporarily fixed gain of the amplifier 24 throughout the remainder of the line so as to yield a background and gain compensated signal. It is clear, however, that a white sample is not stored or utilized during this operating period, and moreover, no divide circuit is utilized, the operation being merely that of setting the gain of the amplifier 24 and then using this fixed gain amplifier 24 as a multiplying or amplifying unit throughout the completion of the single line scan period. At the completion of each line scan the Krallinger, et al. circuit is reset by the sync pulse and repeats its calibration and operation functions during each successive line scan.

This operation of recalibrating at each line of the scan in the Krallinger, et al. device presents its own peculiar problems. If the black line or the white margin varies in shade along its length, this will result in different shading and contrast characteristics along the length of the document page being transmitted by the Krallinger, et al. transmitter.

The Johnson reference is merely cumulative to the Krallinger, et al. reference. The Johnson reference relates to an automatic gain control circuit for reading video signals recorded on a magnetic tape or other recording medium. The system assumes that successive black and white representing calibration signals have been inserted in the video recording in the blank or retrace area and these signals are used to set the gain of the following

amplifier. As in the Krallinger, et al. device, the black signal is stored in a capacitor 55 to set a base voltage reference for the operation of the device. However, the immediately following white signal is not in any way sampled or stored but is instead used to control the setting of the gain of the variable amplifier of the device to bear a fixed relation to a reference bias. Thus, the ensuing white sample is not sampled or stored in any manner and is not available during the ensuing operation. What is used during the ensuing operation is the stored black signal and the fixed gain of the variable amplifier which is held at a fixed gain level by integrated error charge on an error condensor 79. As in the Krallinger, et al. device, this charge on error condensor 79 represents the integral of the error values of the amplifier gain servo and is not a sample of the white signal.

It is, moreover, clear referring to the Krallinger, et al. and Johnson references that their circuitry and functions are so dissimilar that neither could be incorporated or combined with the other without destruction of both the primary and secondary reference. There is no teaching whatsoever for such combination and such combination could only be done by way of hindsight and through destruction of the operating circuitry of these references.

Referring now to the claims and keeping in mind the aforedescribed distinctions between the structure and function of the present invention and that of the references. It is clear, referring to Claim 1, that although the references do show the element A of the combination ("means for storing a first sample of said input signal"), the references do not show the second element B of the combination ("means for storing a second sample of said input signal when said input parameter is at its second

magnitude"). Thus, Krallinger, et al. or Johnson may show a device which stores a sample of the black value of the input signal but they do not store a second sample of the white value of the input signal. Similarly, referring to element C of the combination, since neither Krallinger, et al. nor Johnson store a second sample of the input signal, they have no apparatus which is operable during the operating period for "combining said input signal and said first and second samples to continually produce . . .". Moreover, in the present amendment in order to further emphasize the above-described distinctions, Claim 1 has been amended at line 11, so that the last named means is recited as "continually combining said input signal and said first and second samples".

Claim 2 is dependent upon Claim 1 and is similarly allowable. Moreover, Claim 2 introduces as a claimed element of the combination a facsimile transmitter having document areas which are scanned therein to produce the black and white signals and the subsequent variable magnitude signal representative of the shade of document area scanned in the transmitter. It is noted that the secondary Johnson reference does not deal at all with a facsimile transmitter but instead depends upon the availability of recorded video signals on a magnetic tape.

Claim 3 is dependent upon Claim 2 and further distinguishes over the references by reciting the automatic sequencing operation of the present ABC systems in which the facsimile transmitter generates the ramp deflection voltage to deflect the scanning element across the document and the first sample of the input signal is automatically stored in response to the ramp voltage reaching a predetermined magnitude corresponding to the scanning of the first area of the document. No such automatic

sampling operation is shown in the Krallinger, et al. reference in response to the magnitude of the ramp deflection voltage of the facsimile transmitter. In the Krallinger, et al. reference, the sampling signal for the black signal is produced by the flash of light from the sync mirror.

In Claim 4 a similar and second apparatus is recited for storing the second sample of the input voltage in response to a second magnitude of the ramp deflection voltage corresponding to the scanning of the second area. This entire structure and operation is entirely absent in the applied references.

Claims 5, 6 and 7 are dependent upon Claim 4 and are similarly allowable.

Referring to Claim 8, this claim fully distinguishes over the applied references by its recitation of "a second circuit means responsive to said first and second samples for continually producing a second different signal representative of their difference in magnitude" and further distinguishes in its recitation of "divider circuit means responsive to said first and second different signals for producing said output signal representative of the quotient of their magnitudes". This structure and operation is entirely absent in the references which do not have a divider circuit and do not continually produce a difference signal representative of the difference of the first and second samples.

Claim 9 is dependent upon Claim 3 and is similarly allowable. Claim 10 is dependent upon Claim 1 and is distinguished over the references in the same manner.

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In the present amendment in order to further distinguish Claim 10, the words "in shunt connection" have been provided at line 3 to clarify the nature of the connection of the storage capacitor to the input of the operational amplifier. Such connection of the storage capacitor is not found in the references.

Claim 11 is a dependent claim which includes most of the aforesaid described distinguishing elements including the production of both separate first and second sampling signals in response to corresponding voltage magnitudes of the horizontal ramp deflection voltage and the storing of the first and second samples in response to the first and second sampling signals, all in combination with a facsimile transmitter which generates a ramp deflection voltage to deflect its scanning element in the calibration scan across first and second calibration areas of corresponding first and second shades of darkness. Thus, Claim 11 is directed to the automatic sequencing of the sampling and hold operations and is clearly distinguished over the references.

Independent Claim 13 is similar in scope to Claim 1 and is distinguished in the same manner by its recitation of its second and third means. The references lack any means for storing a second sample of the video input signal or producing a second signal representing said stored second sample, and further lacks any means for continually combining said video input signal with said first and second signals during scanning of said source document areas. Claim 13 is dependent upon Claim 12 and is similarly allowable. Claim 14 is also dependent upon Claim 12 and is similarly allowable. Moreover, in the receiver of the Krallinger, et al. reference, the successive black and white signals applied to the receiver are merely arbitrary locally generated reference signals and have nothing whatsoever to do with the

black and white signals generated by the calibration scan across the document as would be required by parent Claim 12.

Claim 15 which is dependent upon Claim 12 is similarly allowable and additionally describes in detail the manner in which the first and second sampling signals are generated in response to the successive voltage magnitudes of the ramp deflection voltage. Claim 16 is dependent upon Claim 12 and similarly distinguishes over the references.

Claim 18 is a method claim which recites separate storage of first and second samples and production of first and second signals representative of the stored first and second samples. Claim 18 further recites combining said first and second signals to produce a second output signal having a magnitude representative of their difference in magnitude and still further recites combining said first and second output signals. As has been previously discussed none of the references have any means for storing a second sample or producing a second signal representative of the stored second sample or combining the first and second signals to produce a second output signal representative of their difference in magnitude. Thus, method Claim 18 is clearly distinguished over the references.

Claim 19 is dependent upon Claim 18 and is similarly distinguished.

In view of the foregoing analysis of the distinguishing features of the claims in relation to the applied references, favorable action is respectfully solicited.

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Respectfully submitted,

s/ Seymour A. Scholnick
SEYMOUR A. SCHOLNICK
Reg. No. 18,037
Attorney for Applicant

9100 Wilshire Boulevard
Suite 710
Beverly Hills, California 90212

Telephone: (213) 550-8161